

REMARKS

The Examiner is thanked for the due consideration given the application. A substitute Abstract is appended to this paper.

Claims 1, 3-6 and 8-31 are pending in the application. Claims 9-13 and 28-30 have been withdrawn from consideration. Claims 2 and 7 are canceled by this amendment, and their subject matter has been generally incorporated into claim 1. Other claim amendments have been made to improve the language and antecedent basis in a non-narrowing fashion.

The rejoinder of species with regards to claims 3,6, 7, 14-27 and 31 is noted with appreciation.

No new matter is believed to be added to the application by this amendment.

The Specification

The Official Action objects to the Abstract as not being of proper language and format. A substitute Abstract of proper language and format is appended to this paper.

Rejection Under 35 USC §112, Second Paragraph

Claims 1-8, 14-27 and 31 have been rejected under 35 USC §112, second paragraph as being indefinite. This rejection is respectfully traversed.

The comments in the Official Action have been considered, and the claims have been appropriately amended. The claims are thus clear, definite and have full antecedent basis.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Art Rejections

Claims 1-8, 14-20, 22-24, 27 and 31 have been rejected under 35 USC §102(b) as being anticipated by JP 2002-260637 (JP '637). Claims 21 and 25 have been rejected under 35 USC §103(a) as being unpatentable over JP '637 in view of SATO et al. (U.S. Patent 6,589,690). Claim 26 has been rejected under 35 USC §103(a) as being unpatentable over JP '637 in view of BARRIERE et al. (U.S. Publication 2002/0168569).

These rejections are respectfully traversed.

The present invention pertains to a negative electrode for a nonaqueous secondary battery that is illustrated, by way of example, in Figure 2 of the application, which is reproduced below.

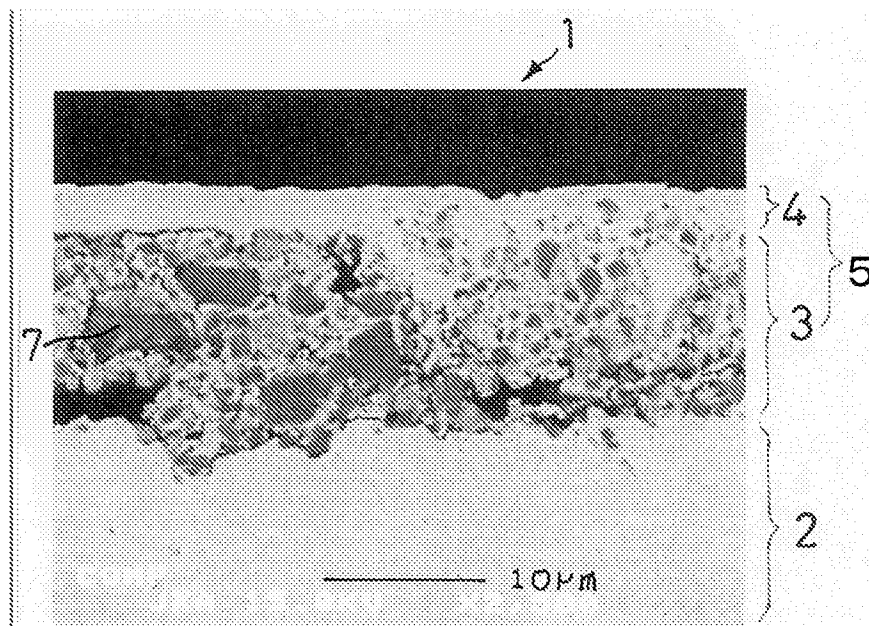


Figure 2

Figure 2 shows a surface coating layer 4, and an active material layer 3 with particles 7.

As is set forth in instant claim 1 of the present invention, the negative electrode includes a current collector and an active material structure formed on the current collector. The active material structure has an active material layer and a surface coating layer located on the active material layer. The active material layer contains (i) an electro-conductive material having low capability of forming a lithium compound, and (ii) active material particles containing a material having high capability of forming a lithium compound. The surface coating layer has a number of micropores which extend in the thickness direction of the surface coating layer and allow a nonaqueous electrolyte to pass therethrough.

According to the claimed electrode having the structure described above, a secondary battery using the claimed electrode has the unexpected result of an extended life compared with a conventional battery since the active material layer is covered with the surface coating layer.

In more detail, even when the active material particles are pulverized due to intercalation and deintercalation of lithium, they maintain the electrical contact with the surface coating layer since they are shut away by the surface coating layer. See page 9, lines 4-17 of the specification.

In addition, the formation of micropores in the surface coating layer allows a nonaqueous electrolyte to sufficiently penetrate into the active material layer and to sufficiently react with the active material particles. Please refer to the first paragraph of page 11 of the specification.

As described above, the electrode of the present invention, as claimed, can successfully prevent fall-off of the active material particles, having been pulverized due to charging and discharging, by the surface coating layer which covers the active material layer while ensuring the flow of a nonaqueous electrolyte to the active material layer via the surface coating layer. The applicants believe that this is at least one patentably distinguishable feature of the claimed invention from the cited references.

Turning to the Official Action, JP'637, which is considered to be the closest prior art, pertains to a negative electrode for a rechargeable lithium battery. The Official Action refers to Figures 2 and 5 of JP '637, which are reproduced below.

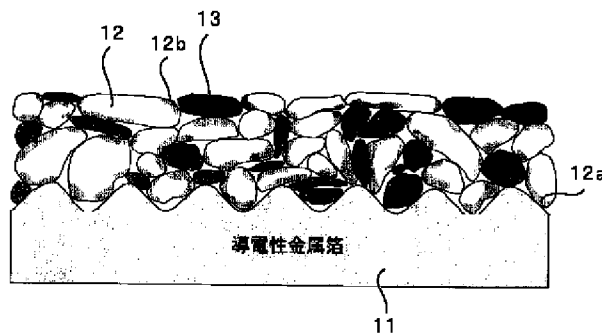


Figure 2

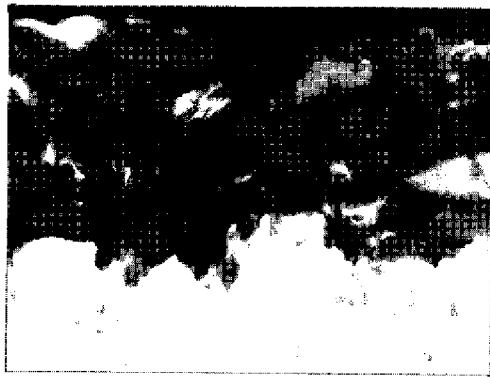


Figure 5

The negative electrode of JP '637 is obtained by providing a conductive metal foil having a surface roughness Ra of 0.2 μm or larger as a current collector and sintering, under a non-oxidizing atmosphere, a layer of a mixture of active material particles containing silicon and/or a silicon alloy, conductive powder and a binder on a surface of said current collector under such conditions that said binder remains after a heat treatment for the sintering.

JP '637 does not teach or suggest the claimed surface coating layer having the micropores extending in the thickness direction of the surface coating layer and allowing a nonaqueous electrolyte to pass therethrough. According to the negative electrode of JP '637, unfavorable fall-off of the active material particles, having been pulverized due to charging and discharging, occurs. Fall-off of the active material particles from the electrode unfavorably reduces the life cycle of the secondary battery.

JP '637 thus does not anticipate a claimed embodiment of the present invention.

With regard to SATO et al. and BARRIERE et al., it is also apparent that the negative electrodes disclosed in these references do not possess the claimed surface coating layer located on the active material layer and having the micropores.

Therefore, one of ordinary skill and creativity would not produce a claimed embodiment of the present invention from a knowledge of JP '637, SATO et al. and BARRIERE et al. A *prima facie* case of unpatentability has thus not been made.

Further, as discussed above, the present invention shows unexpected results that would rebut any unpatentability that could be alleged.

These rejections are believed to be overcome, and withdrawal thereof is respectfully requested.

Conclusion

Prior art not of record is believed to be non-pertinent to the instant claims.

The objections and rejections are believed to have been overcome, obviated or rendered moot, and no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item:

- new Abstract of the Disclosure